

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A wafer polishing head for polishing a semiconductor wafer on a polishing pad, said polishing head comprising:
 - a housing including an upper housing portion;
 - a retaining ring having an interior cylindrical surface and defining an interior cylindrical pocket sized to carry said wafer and to laterally restrain movement of said wafer when said wafer is moved relative to said polishing pad while being polished against said polishing pad;
 - a wafer subcarrier attached to said retaining ring by a primary diaphragm and to said housing by a secondary diaphragm; and
 - a resilient pneumatic annular sealing bladder coupled for fluid communication to a first pressurized pneumatic fluid to define a first pneumatic zone and attached to a first surface of a wafer stop plate adjacent to said retaining ring interior cylindrical surface to receive said wafer and to support said wafer at a peripheral edge,
 - wherein said resilient pneumatic annular sealing bladder defines a second pneumatic zone radially interior to said first pneumatic zone and extends between said first surface of said wafer stop plate and said wafer when said wafer is attached to said polishing head during a polishing operation and is coupled for fluid communication to a second pressurized pneumatic fluid,
 - wherein said first surface of said wafer stop plate is not in contact with a wafer back side surface during polishing of said wafer,
 - wherein said wafer stop plate is operative to prevent said wafer from flexing excessively during non polishing periods by an applied vacuum force used to hold said wafer to said polishing head during wafer loading and unloading operations, and
 - wherein said first and said second pressurized pneumatic fluids are adjusted to achieve a predetermined polishing pressure profile over a front side surface of said wafer.

Claims 2-8. (Canceled)

9. (Currently Amended) A workpiece tooling head for polishing or planarizing a workpiece on a polishing pad, said polishing head comprising:

a retaining ring having an interior cylindrical surface and defining an interior cylindrical pocket sized to carry said workpiece and to laterally restrain movement of said workpiece when said workpiece is moved relative to said polishing pad while being polished against said polishing pad, said retaining ring having a lower surface that is pressed against said polishing pad by a first pressurized fluid to define a first pressure zone of said retaining ring against said polishing pad during polishing of said workpiece; and

a resilient seal disposed adjacent to said retaining ring interior cylindrical surface to receive said workpiece and to support said workpiece at a peripheral edge and defining a second pressure zone between said workpiece and said polishing pad when said workpiece has been mounted to said head that is coupled for fluid communication to a second pressurized fluid;

wherein said first and said second pressurized fluids are adjusted to achieve a predetermined polishing pressure profile over a front side surface of said workpiece.

10. (Currently Amended) A workpiece tooling head according to claim 9, further comprising a workpiece stop plate attached to said retaining ring,

wherein said workpiece stop plate is operative to prevent said workpiece from flexing by an amount that would damage the structure of said workpiece during non-polishing periods by an applied vacuum force used to hold said workpiece to said polishing head during workpiece loading and unloading operations.

11. (Previously Presented) A workpiece tooling head according to claim 9, wherein said workpiece comprises a semiconductor wafer.

12. (Previously Presented) A workpiece tooling head according to claim 9, wherein said workpiece comprises a glass substrate.

13. (Currently Amended) A workpiece polishing head for polishing or planarizing a workpiece on a polishing pad, said polishing head comprising:

a retaining ring having an interior cylindrical surface and defining an interior cylindrical pocket sized to carry said workpiece and to laterally restrain movement of said workpiece when said workpiece is moved relative to said polishing pad while being polished against said polishing pad, said retaining ring having a lower surface that is pressed against said polishing pad by a first pressurized fluid to define a first pressure zone of said retaining ring against said polishing pad during polishing of said workpiece; and

a workpiece attachment plate attached to said retaining ring for carrying said workpiece during polishing, said workpiece attachment plate having a plurality of resilient concentric annular sealing ridges extending from a surface of said workpiece attachment plate and defining substantially independent pressure zones when pressed against a back side surface of said workpiece, each said pressure zone being coupled for fluid communication to a source of pressurized fluid,

wherein a first one of said plurality of resilient concentric annular sealing ridges is disposed adjacent to said retaining ring interior cylindrical surface to receive said workpiece and to support said workpiece proximate to a peripheral edge and defines a second pressure zone,

wherein said second pressure zone is coupled for fluid communication to a second pressurized fluid,

wherein a second one of said plurality of resilient concentric annular sealing ridges is disposed interior to said first annular sealing ridges and is coupled for fluid communication to a third pressurized fluid, and

wherein said first, said second, and said third pressurized fluids are adjusted to achieve a predetermined polishing pressure profile between said polishing pad and a front side surface of said workpiece during polishing.

14. (Currently Amended) A workpiece polishing head according to claim 13, wherein said workpiece attachment plate further includes a workpiece stop plate operative to prevent said workpiece from flexing by an amount that would damage the structure of said workpiece during

non-polishing periods by an applied vacuum force used to hold said workpiece to said polishing head during workpiece loading and unloading operations.

15. (Previously Presented) A workpiece polishing head according to claim 13, wherein said workpiece comprises a semiconductor wafer.

16. (Previously Presented) A workpiece polishing head according to claim 13, wherein said workpiece comprises a glass substrate.

Claims 17-22. (Cancelled)

23. (Currently Amended) A substrate planarization machine comprising:
a floating retaining ring; and
a diaphragm which mounts a substrate and is supported by said floating retaining ring,
wherein said floating retaining ring retains said substrate to said diaphragm during
planarization against a polishing pad, and
wherein said diaphragm is attached to said floating retaining ring by inserting a portion of
said diaphragm into a groove formed in an interior cylindrical surface of said retaining ring.

24. (Previously Presented) The substrate planarization machine according to claim 23,
wherein said substrate is a substrate selected from the set of substrates consisting of a glass
material, a semiconductor material, a metallic material, and combinations thereof.

25. (Currently Amended) A substrate processing machine comprising:
a floating retaining ring; and
an open diaphragm which mounts a substrate and is supported by said floating retaining
ring,
wherein said open diaphragm presses said substrate against a material removal tool
during processing while said floating retaining ring retains said substrate to said open diaphragm,
and

wherein said open diaphragm is attached to said floating retaining ring by inserting a portion of said open diaphragm into a groove formed in an interior cylindrical surface of said retaining ring.

Claims 26-33. (Cancelled)